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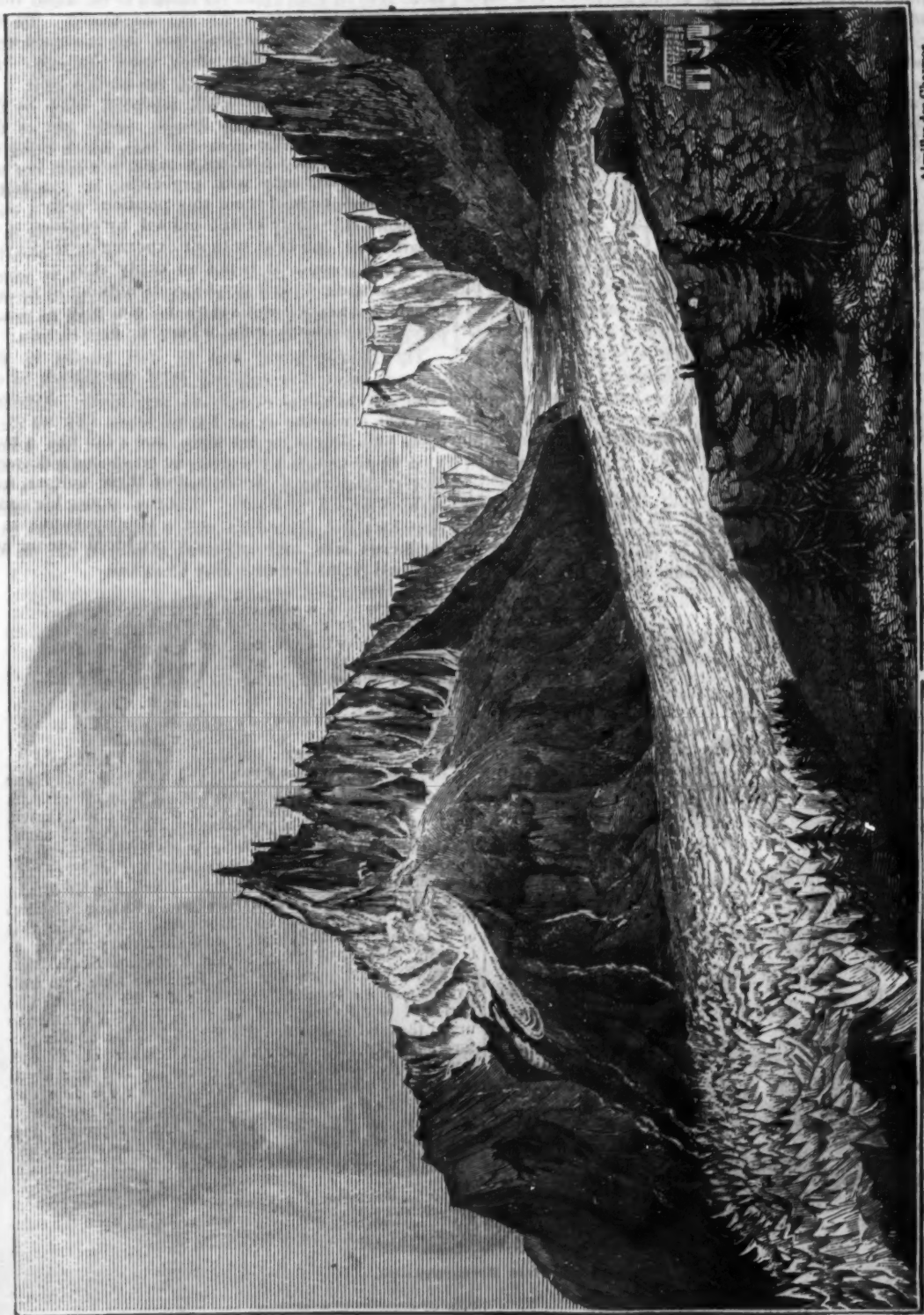
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Alpilles des Chamois.

Alpilles du Dru.

THE MER DE GLACE, OR SEA OF ICE FROM MONTANVERT, ON MONT BLANC.

## SOME ACCOUNT OF THE VALLEY OF CHAMOUNI,

AND OF

## THE ASCENT OF MONT BLANC.

## PART THE FIRST.

CHAMOUNI, or Chamounix, is the name of an Alpine valley, situated in that part of the dominions of the king of Savoy, which is known by the name of Savoy, and which, although politically it must be regarded as an Italian province, in spite of its lying on the northern side of the Alps, is in point of fact a border-country, whose natural character, like the dialect of its inhabitants, is neither Italian, Swiss, nor French, but a compound of all three. The length of the valley is about thirteen miles, and its breadth varies from one to two; the whole of it is elevated more than 3000 feet above the level of the sea, and on all sides it is enclosed by lofty mountains, through which there is only a single opening at one end, to allow the escape of the river which waters it. The direction of the valley is north-east and south-west; that is to say, one end of it points to the north-east, and the other to the south-west. The northern end, or that pointing to the north-east, is completely closed up by a mountain, called the Col de Balme\*; and the southern end, or that pointing to the south-west, is bounded by Mont Vaudagne, which does not, however, completely close up the valley at this end, since it affords a passage at one of the corners to the river Arve, which has come down through the valley from the Col de Balme, in which it has its source. The mountains which bound the two sides of the valley are much more considerable than those which bound its ends. On its western side, or that turned towards Switzerland, is a long unbroken rampart, a part of which, rising into a rounded summit, is called Mont Brevin, and a part rising into a succession of sharp peaks, is called the *Aiguilles Rouges*, literally the "Red Needles." On the eastern side rises to a towering height that enormous mountain, to the whole of which, as well as to that one of its summits which rises above all the rest, and, indeed, above all in Europe, the name of Mont Blanc is given.

It is to the circumstance of Mont Blanc forming the boundary of one of its sides, that the Valley of Chamouni owes the principal share of these attractions which have rendered it so famous a place of resort for tourists. Of all the mountains which surround the valley, it is the only one which reaches the line of perpetual snow†, and above this line it rises upwards of 7000 feet; so that in the summer season, when the rest of them have thrown off their wintry covering, and are to a certain extent clothed with verdure, Mont Blanc still retains its "robes of ice," and "coronet of snow." Its great height is also the cause of another remarkable and very attractive feature of this mountain,—namely the *glaciers*, or streams of ice, which throughout the whole year, Winter and Summer, stretch down its sides, not merely below the line of perpetual snow, but even into the very valley at its base.

Simond compares the Valley of Chamouni to a street with splendid edifices, raised by the hand of Nature, on either side; "they are so high, and the interval comparatively so narrow, that little more is seen than the ground-story." The magnificent front of Mont Blanc, rising to the perpendicular height of more than twelve thousand feet above Chamouni, itself upwards of three thousand feet above the sea, occupies the south side of this street; and over the way stand the Brevin, which is Mont Blanc's

nearest neighbour; and other mountains following on that side as far as the Col de Balme, which terminates the long vista at the distance of about eighteen miles. "The first evening of our arrival," adds this writer, "we merely went curiously along, looking in wonder on the buttresses, which at regular distances seem to prop up the base of Mont Blanc. They are, I believe, all composed of the calcareous strata, turned up against the granitic mass, and less precipitous than the rest of the front; they afford a footing for trees, differing in species according to height: the first zone deciduous, the next composed of pines, then larches; forest above forest, waving their tufty and dark shades, accessible as far as three or four thousand feet above Chamouni. The interval between each of these verdant buttresses is filled by a glacier. . . . The cap of snow over the head of Mont Blanc covers the neck and shoulders of the giant, and hangs down to the ground, forming an irregular drapery, of which the glaciers just enumerated are the skirts."

It is a curious circumstance that this celebrated valley, lying at the foot of the loftiest mountain in Europe, has not been known to the world so long as a century,—and that, in fact, it was not discovered, if we may use the expression, until long after the surrounding countries had been ransacked for the picturesque. The account of its discovery is amusing. "It was in 1741," says Ebel, "that the celebrated traveller Pococke, and another Englishman named Wyndham, visited it, and gave to Europe, and to the whole world, the first notions of a country, which is situated at the distance of only eighteen leagues from Geneva. As everybody thought that this valley was a den of banditti, and of barbarous and savage people, the resolution of these gentlemen to visit it was blamed: they were so seriously counselled to be upon their guard, that they set off from Geneva armed to the very teeth, with a number of servants no less armed: they did not venture to enter any house in the valley, but encamped under tents, and kept up fires, and a watch by sentinels the whole night. The mountains of the neighbourhood were then known under the name of *Montagnes Maudites*, or Cursed Mountains."

The celebrated naturalist, Saussure, also tells us, that in his time this name was applied to the Mont Blanc and the snow-covered mountains around it, by the children of Geneva and its neighbourhood; and he adds, that in his youth he had heard it said, that the eternal snows upon them were the fruits of a curse which the inhabitants had drawn upon themselves by their crimes. It is certain, however, that the valley was inhabited, and had communications with the neighbouring districts during the six hundred and fifty years prior to the visit of Pococke and Wyndham; though it is probable, as Captain Sherwill observes in his *Historical Sketch*, that the valley would have remained for some time comparatively unknown to travellers, had not "the indefatigable zeal and manly prudence" of these English gentlemen urged them on to examine the hidden beauties of this picturesque, but, till then, neglected corner of Europe. Saussure paid his first visit to this valley in 1760; it was this able naturalist, and his countrymen De Luc and Bourrit, who fully exposed its attractions, and rendered it famous all over the civilized world. At the present day, the Valley of Chamouni is annually visited by scarcely less than two thousand tourists; it forms the head-quarters of all those who venture to explore the glaciers of Mont Blanc, as well as of the more daring few who are content to peril their lives for the sake of standing upon the summit of Europe.

## THE COL DE BALME.

THERE are only two ways in which the Valley of Chamouni can be entered, one at each end. At the sides it is inac-

\* The name Col is applied to several parts of the Alps and Apennines, where there is a depression in the mountain-range, and a pass, or road, over it. It is derived by some from the Italian word *colle*, or the Latin word *collis*, signifying a hill; but as it is difficult to understand why a mountain-pass should be called a hill, by way of distinguishing it from the rest of the mountain: this explanation does not seem very satisfactory. Perhaps it should rather be derived from the Italian word *collo*, (the Latin *collum*), signifying the neck or shoulder, the relation of which to the head may be fairly compared with the relation of a depressed pass with the higher mountain rising by its side.

† For an explanation of this expression, see *Saturday Magazine*, Vol. I., p. 123.

cessible; the chain of Mont Blanc upon the east, and the opposite range of mountains upon the west, are impassable barriers, forbidding the attempt to penetrate into it in those directions\*. The entrance at the north-eastern end is a double one, that is to say, there are two routes leading into the valley at that point. The principal one is across the Col de Balme and down the slope with which it bounds this end of the valley; the other is by a mountain-pass, called the *Tête Noire*, (literally Black Head,) which joins the former route while it is descending the slope of the Col de Balme. Each of these routes will conduct the traveller out of the valley into the Swiss Canton of Valais, where they both meet at the little village of Trient. The latter is the longer of the two, it being, in point of fact, a deviation from the other, made for the purpose of passing the mountain which divides Switzerland from Savoy, at the *Tête Noire*, instead of at the Col de Balme; Saussure, however, recommends it as the preferable route of the two, because it is less steep, and not so hazardous as that over the Col de Balme when the snows are not fully melted. Travellers generally, however, enter the Valley of Chamouni at the other or south-western end, by the road leading thither from Geneva. Some visit it merely for an excursion; they return to Geneva either taking the way by which they came, or more frequently, passing out at the opposite end by the Col de Balme or *Tête Noire*, to Trient, and thence to Martigny, where they fall into the great road leading from Geneva to the Simplon. Others visit it on their way from Geneva to Italy, and thus, instead of starting at once from Geneva upon the Simplon road, make a *détour*, and join that road at Martigny.

Those travellers who visit Chamouni merely on an excursion from Geneva, and entering the valley at the south-western end return the same way, generally ascend the Col de Balme, in order to enjoy the fine view which it affords. The height of this pass is about 7200 feet above the level of the sea; the mountain on its sides rises to a still greater elevation, the height of the loftiest point of the boundary between Switzerland and Savoy at this point, being, according to Saussure, 7552 feet. Above the valley, the Col rises nearly 4000 feet; and the view which it affords is spoken of by all writers in terms of rapture and astonishment.

"Looking to the west," says Mr. Bakewell, "Mont Blanc is seen in profile, from its summit to its base, and its different parts rise above each other in their just proportions. The summits of the principal Aiguilles, those of Charmos, the Aiguille Verte, the Aiguille de Dru, the d'Argentière, and de la Tour, are seen nearer and in the same range. These peaks rise from 11,000 to 13,000 feet above the level of the sea, and would, in any other position, be regarded with astonishment; but the effect of their amazing height is diminished by the superior elevation and magnitude of Mont Blanc. On the north side of the valley are seen a lower range of mountains, which, from their red colour, are called the Aiguilles Rouges. Beyond these is Mont Breven; and nearer on the north-west, rise the mountains of the Valorsine. The Valley of Chamouni appears deep and narrow, and is seen from one end to the other, with the Arve winding along it. The Col de Balme, on which we stand, closes the eastern end of the valley; and a mountain called the Vaudange, closes the western extremity. The length of the valley is about fifteen miles. When viewed from hence, there can be little doubt of its having once formed a lake, before the waters of the Arve escaped, as at present, through a lateral chasm at Pont Pelissier."

Dr. Barry thus describes the view, with more enthusiasm. "The ascent from Martigny, in the valley of the Rhone, was very steep. Nothing was seen, advancing towards the top, besides the rocks that formed it. When suddenly upheaved itself a scene of alpine magnificence, long unapproachable and overwhelming; an amazing picture, which eye knew not how to scan, chaining the beholder, lost in an astonished gaze. The prodigies of nature piled up there, east other, even alpine splendour, far into the shade. A thousand towering dark and savage peaks,—lightning-riven battlements, at whose bases, hardened and heaped

up, great depths of ice, bidding defiance to the sunbeams; and glaciers, winding many a league downwards through their own ravines, like belts of brightness, 'flung over a region' black with pines. Beneath that heaven-high wall of frowning rock and chilling ice, bordering upon the barrier of permanent congelation, and like an oasis within a wilderness of frost, was the green vale of Chamounix, smiling with rural beauty and the abodes of man; the river Arve rising at my feet, and winding its way in silver through the meadows of that vale.

"But, for those scenes of softer beauty the eye was paralyzed.—it saw them not, save in so far as they made, by contrast, the icy regions towering above them, more arctic, chill, and awfully sublime. To these, the eye, spell-bound, ever returned; and yet the one great sorcerer of the mighty scene remains unnamed. Surrounded by those 'rugged heights of rocks,' those battlements, towering nine thousand feet and more above the valley,—so vertical, that snow rests not upon their sides,—there rose, far higher than them all, a snowy pyramid, in proud supremacy, yet placid and serene. It was 'the father of the Alps,' Mont Blanc himself, enthroned among, and guarded by his dark aiguilles."

#### THE SOUTH-WESTERN ENTRANCE OF THE VALLEY.

It is by this entrance, as we have observed, that most visitors make their way into the valley of Chamouni, along the road leading from Geneva, by the side of the Arve through Bonneville, La Cluse, St. Martin, Chede, and Servoz. The summit of Mont Blanc, and some of the neighbouring peaks or *aiguilles* are visible from Geneva; but soon after the traveller has left that city they disappear from his view, and are not again seen by him till he arrives within twenty miles of Chamouni. The whole of the route, however, is interesting, and it becomes more so, the nearer he approaches to the object of his destination. Shortly before he reaches the town of Cluse, the valley of the Arve, which has previously been broad and open, becomes contracted into a narrow and winding defile, presenting some scenes of striking beauty. Passing the cascade of the Nant d'Arpenas, remarkable chiefly for its height, he at length reaches St. Martin, having travelled forty miles from Geneva. At this little village, if he conform to the usual practice, he will pass the night; and here, at all events, he will quit his carriage, since the remainder of his route is practicable only on foot, on a mule, or in a *char-à-banc*.

The approach to the Valley of Chamouni from St. Martin, when Mont Blanc again becomes visible, is extremely interesting. Passing the celebrated cascade of Chede, and a mile further on, the little lake of the same name, the traveller reaches a dangerous part of the road, where it is carried at a considerable height above a deep ravine, through which rushes a dark mountain-torrent, and which is partly filled up with masses of rock that have fallen from the overhanging mountains, sometimes causing fatal accidents. Thence he descends to the little village of Servoz, lying sunk in a valley at the foot of a lofty mountain, which seems to menace it with destruction, and has, indeed, more than once, sent down masses of earth and rock, inflicting heavy calamities on the inhabitants. Soon after leaving Servoz the road crosses the Arve at the bridge called Pont Pelissier, and almost immediately enters that defile through which the Arve makes its escape from the Valley of Chamouni, and which Mr. Bakewell styles one of the most striking gorges in the Alps.

Saussure, who describes this entrance into the valley of Chamouni as a "wild and narrow defile, forming a truly alpine approach," speaks of the valley itself as presenting an aspect infinitely soft and pleasing. The bottom, he says, "is covered with meadows, in the midst of which passes the road bordered with small palisades. You discover in succession the different glaciers which descend into this valley. At first you see only that of Tacconay which is almost suspended on the steep slope of a little ravine, of which it occupies the bottom. But very soon the eyes are fixed upon that of the *Buissons*, which you see descending from among the summits in the neighbourhood of Mont Blanc; its ice, of a dazzling whiteness, shaped into the images of lofty pyramids, produces an astonishing effect in the midst of the pine-forests which they cross and overtop. At length you see afar off the great *Glacier des Bois*, which, in descending, bends towards the Valley of Chamouni; you distinguish its walls of ice rising above the yellow rocks cut into peaks. These ma-

\* This remark must be understood in a qualified sense; to all ordinary travellers these barriers are impassable, but the former has been surmounted by a very few adventurous ones who have crossed the chain of Mont Blanc at that particular depression, known by the name of the *Col du Géant*. This crossing of the mountain at that part, is a very different affair from the ascent to that summit which is called Mont Blanc, in the restricted sense of the name.

iclastic glaciers, separated by great forests, crowned with granite rocks of an astonishing height which are cut into the shape of large obelisks, and intermingled with snow and ice, present one of the grandest and most singular spectacles which it is possible to imagine. The pure and fresh air which you breathe, so different from the close air of the valleys of Salenche and Servoz, the fine cultivation of the valley, the pretty hamlets which you meet at each advance, give you the notion upon a fine day, of a new world, a species of terrestrial paradise, shut up by a beneficent God within the enclosure of these mountains. The road, everywhere fine and easy, leaves you at liberty to give yourself up to the delicious reverie, and to the varied ideas which present themselves in a crowd to the mind.

"Sometimes loud crashes like thunder-claps, and like them, too, followed by prolonged rolling, interrupt this reverie, cause a sort of terror when you are ignorant of the cause, and show you, when you have become aware of it, how enormous are the masses of ice whose fall produces so terrible a crash. The size of objects is a source of deception in estimating distances; on entering the valley you think that in less than half an hour you will reach the other end; and yet it takes you two hours to reach the priory, which is not half-way."

#### THE RIVER ARVE.

\* This river rises on the Col de Balme, near the summit of the pass, flows with rapidity down its steep slope, and through the Valley of Chamouni, then passing out at the south-western extremity through the narrow defile which we have already described, continues its impetuous course as far as the Rhone, which it enters a little below Geneva, after a course of about sixty miles from its source. Its waters are principally derived from the glaciers of Mont Blanc, from which issue the Arveiron and other smaller streams, emptying themselves successively into its channel as it flows along in its course through the valley. It is very remarkable for the rapidity of its current, which is so great even at the end of its course, that its waters do not mingle with those of the Rhone, for some time after it has entered that river; it is said that at times its violence has been such as to have impeded the course of the Rhone, and to have caused the waters of that river to flow back into the lake of Geneva, thus giving to the water-wheels of the mills on its banks a direction contrary to their usual one.

The outlet of this river at the south-western end of the valley seems to be one which it has opened for itself. Mr. Bakewell says that the valley "may be regarded as a deep trough about twelve miles in length at the bottom, having no original outlet at either end; but the waters have worked a lateral passage in a rock of soft slate, and near its junction with a very hard granite, forming a deep chasm which extends four miles or more from near Ouches to Pont Pelissier. Before this chasm was opened, the valley of Chamouni must have been a lake surrounded everywhere by steep mountains. As the height of the bottom of the valley above the level of the sea exceeds considerably 3000 English feet, it is therefore as elevated as the summit of Scafell, in Cumberland, the highest mountain in England."

In the following passage from Mr. Lyell's *Principles of Geology*, the possibility of this valley's again becoming a lake is contemplated. "Those naturalists who have seen the glaciers of Savoy, and who have beheld the prodigious magnitude of some fragments conveyed by them from the higher regions of Mont Blanc to the valleys below, a distance of many leagues, will be prepared to appreciate the effects which a series of earthquakes might produce in this region, if the peaks or 'needles,' as they are called, of Mont Blanc, were shaken as rudely as many parts of the Andes have been in our own times. The glaciers of Chamouni would immediately be covered under a prodigious load of rocky masses thrown down upon them. Let us then imagine one of the deep narrow gorges in the course of the Arve, between Chamouni and Cluse, to be stopped up by the sliding down of a hill-side, (as the Rossberg fell in 1806,) and a lake would fill the Valley of Chamouni, and the lower parts of the glaciers would all be laid under water. The streams which flow out of arches at the termination of each glacier, prove that at the bottom of those icy masses there are vaulted cavities through which the waters flow. Into these hollows the waters of the lake would enter, and might thus float up the ice in detached icebergs; for the glaciers are much fissured, and the rents would be greatly increased during a period of earthquakes. Icebergs thus formed might, we conceive, resemble those

seen by Captain Scoresby far from land in the Polar Seas which supported fragments of rock and soil, conjectured to be above fifty thousand tons in weight. Let a subsequent convulsion then break suddenly the barrier of the lake, and the flood would instantly carry down the icebergs, together with their burden, to the low country at the base of the Alps."

#### THE GLACIERS.

AND you ye five wild torrents fiercely glad!  
Who called you forth from night and utter death,  
From dark and icy caverns called you forth,  
Down those precipitous, black, jagged rocks,  
For ever shattered, and the same for ever?  
Who gave you your invulnerable life,  
Your strength, your speed, your fury, and your joy,  
Unceasing thunder and eternal foam?  
And who commanded (and the silence came,)  
Here let the billows stiffen and have rest?  
Ye ice-falls! ye that from the mountain's brow,  
Adown enormous ravines slope amain—  
Torrents, methinks, that heard a mighty voice,  
And stopped at once amid their maddest plunge!  
Motionless torrents! silent cataracts!  
Who made you glorious as the gates of Heaven  
Beneath the keen, full moon? Who bade the sun  
Clothe you with rainbows? Who with living flowers  
Of loveliest blue, spread garlands at your feet?—  
God! let the torrents, like a shout of nations,  
Answer; and let the ice-plains echo, God!  
God! sing ye meadow-streams with glad voice!  
Ye pine-groves with your soft and soul-like sounds!  
And they too have a voice, yon piles of snow,  
And in their perilous fall shall thunder God!—COLERIDGE.

"No subject in natural history," says Cox, "is more curious than the origin of these glaciers, extending into fields of corn and pasture, and lying, without being melted, in a situation where the sun is sufficient to bring the fruits of the earth to maturity: for it is almost literally true, that with one hand I could touch ice, and with the other, ripe corn." It is the glaciers of Mont Blanc, as Mr. Bakewell observes, which constitute the chief interest of Chamouni; for nowhere else in the Alps are they of such magnitude, or do they approach so far into the regions of cultivation, as here. "The glaciers in the Bernese Oberland," he says, "are not to be compared with them, nor can any description or graphic representation give an adequate idea of the scene. Could we suppose a torrent nearly a mile in breadth, and several hundred feet in depth, to be descending down the side of a mountain, rolling waves over each other more than fifty feet in height, and the whole to be instantly consolidated and split into angular fragments on the surface, we might have a tolerably correct notion of a glacier, but without seeing it we should still have but a feeble conception of the impression that such an object would excite."

"If," says Saussure, "an observer could be conveyed to such an elevation above the Alps, as to embrace at one view those of Switzerland, of Savoy, and of Dauphiné, he would behold this chain of mountains, intersected by numerous valleys, and composed of many parallel chains, the highest one of them occupying the centre, and the others gradually diminishing in proportion to their distance from that centre."

"The most elevated, or central chain, would appear bristled with pointed rocks, covered, even in Summer, with ice and snow, in all parts that are not absolutely perpendicular. But on each side of this chain he would perceive deep valleys clothed with a beautiful verdure, peopled with numerous villages, and watered by rivers. In considering these objects with greater attention, he would remark, that the central chain is composed of elevated peaks and ridges, covered with snow on their summits; but that all the slopes of these peaks and ridges—or at least, all those not extremely steep, are laden with ice; and that the intermediate spaces form deep valleys filled with immense masses of ice, which seem about to pour down into those cultivated valleys which border the great chain."

The chains most contiguous to that of the centre, would present to the observer the same phenomena, only in a lesser degree. At greater distances no ice would be observed, and scarcely any snow, but upon some of the most elevated summits; and at last, the mountains, diminishing in height, would lose their rugged aspect, and put on more soft and rounded forms, become covered with verdure, and gradually expire on the borders of plains, and become confounded with them."

\* Within a few paces of the glaciers, the *Gentiana major*, with its "flowers of loveliest blue," grows in great profusion.

Regarding Mont Blanc as an assemblage of separate peaks and ridges, we find the valleys or spaces between them occupied by glaciers, some of which run in the direction of the length of the mountain, parallel to the Valley of Chamouni, and others in the direction of its breadth, or as if they would enter the valley; in other words, some of the glaciers occupy the longitudinal ravines of the mountain, and others its transverse ravines. Among the latter are the five great glaciers which are seen sloping down to its base from the Valley of Chamouni; there are other similar glaciers sloping down the other side of the mountain into the other valleys which bound it, but for the present we shall not speak of those. The five glaciers in question are these, de Taconnaz, de Bossons (or Buissons), des Bois, d'Argentière, and de la Tour; the order in which we have named them being that in which they occur, beginning at the south-western end of the valley. The first three, after rising to a certain height, join a great longitudinal glacier, called the *Glacier de Tacul*, of which they may thus be regarded as three sloping lateral branches; and in like manner the remaining two join another longitudinal glacier, which has no particular name. The thickness or depth of the ice of these glaciers, varies in different parts. Saussure says, that he found its general depth in the *Glacier des Bois*, to be from eighty to a hundred feet; but he is not inclined to question the correctness of those who assert, that in some places its thickness exceeds even six hundred feet.

"These immense fields of ice," says Coxe, "usually rest on an inclined plane, being pushed forwards by the pressure of their own weight, and but weakly supported by the rugged rocks beneath; they are intersected by large transverse chasms, and present the appearance of walls, pyramids, and other fantastic shapes, observed at all heights and in all situations, wherever the declivity exceeds thirty or forty degrees. But in those parts, where the plain on which they rest is horizontal, or gently inclined, the surface of the ice is nearly uniform; the chasms are but few and narrow, and the traveller crosses on foot, without much difficulty. The surface of the ice is not so slippery as that of frozen ponds or rivers; it is rough and granulated, and is only dangerous to the passenger in descents. It is not transparent, is extremely porous, and full of small bubbles, which seldom exceed the size of a pea, and consequently is not so compact as common ice." This perfect resemblance of the ice of the glaciers to congealed snow impregnated with water, in its opacity, roughness, and in the number and smallness of the air-bubbles, has led to the supposition that it is formed by the consolidation of the snow, aided by the freezing of the small portion which is melted by the heat of the sun in summer.

An immense quantity of snow is continually accumulated in the valleys which are enclosed within the Alps, as well from that which falls from the clouds during nine months in the year, as from the masses which are incessantly rolling from the steep sides of the circumjacent mountains. Part of this snow, which is not dissolved during summer, impregnated with rain and snow-water, is frozen during winter, and forms that opaque and porous ice of which the glaciers are composed. "As the surface of the snow," says Mr. Bakewell, "thaws and percolates the mass, it is again frozen, and acts as a cement; and by a repetition of this process, the whole mass is converted into ice; not so compact, however, as that of rivers and lakes, for it is full of air-bubbles, owing to the mode of its formation."

The sloping glaciers which rest on inclined planes are constantly moving downwards, slowly and imperceptibly, but with irresistible force, and at the rate in some cases, it is said, of a foot each day. As they descend, there is a certain point "at which," to use the words of Mr. Bakewell, "the equilibrium between the two forces, heat and gravity, that act on the glacier, is established;" that is to say, the ice at the lower end of the glacier being exposed to a warm temperature, is dissolved as fast as it is urged downwards by its own weight, and by that of the ice above, which resting on an inclined plane presses upon it. It is in this descent of the ice that are formed those great rents or chasms which form so remarkable a feature of the glaciers. "Where in contact," says Dr. Barry, "with the warmer surface of the ground on which they rest, and at their sides, they thaw; and being thus loosened, way is made for their descent. But here and there some obstacle occurs, that holds them, until their weight overcomes and carries downwards the obstruction: or, when the latter does

not yield, the glacier becomes transversely rent, by which the lower portion of the mass is separated, and proceeds, the fissure widening, until filled up by the ice-débris of avalanches, or the next winter's snow. The obstacles consist, for the most part, of rocks, projecting from the sides of the ravines. A little water from the surface of the glacier, finds its way in the day-time into the crevices of these rocks, and in the night irresistibly expanding into ice, loosens them, so that they must eventually yield. Glaciers thus widen their ravines, by taking from their sides. Hence the vast lateral accumulations of débris and the uprooted branchless pines. The former, at the sides of the Bossons glacier, are called 'the Moraines.' The surfaces of glaciers present, besides, great and general inequalities, which, using a geological expression, may be called slips, with vast overhanging mural precipices, referrible to corresponding inequalities in the beds of their ravines."

As the ice is thus dissolved as fast as it descends, the lower end of the glaciers generally remains in the same place, though the ice of which it is composed is continually changing. Sometimes, however, the glaciers encroach upon the valley. Mr. Bakewell says, that after a series of cold seasons, they enlarge and advance, and after a series of warm summers, they diminish and recede. Simond, however, says that it is the quantity of snow falling upon the top of Mont Blanc, that is, upon the upper third of its height, where it never melts, which determines the progressive encroachments at the lower end, of the glaciers over the green fields of the valleys, and not the intensity of the cold. He supports his remark by a reference to the state of things when he visited Chamouni, in 1817. The previous winter, he says, was remarkably mild all over Europe, but it was rainy, and as rain is always snow on the top of high mountains, a great quantity of snow was accumulated on Mont Blanc; "the accumulation," he says, "has by its own weight pushed down the glaciers some hundred feet further than usual over the valley of Chamouni." Their progress had been very mischievous; his description of the appearance which they presented at the time of his visit is interesting. "With slow but irresistible power," he says, "the ice pushes forward vast heaps of stones, bends down large trees to the earth, and gradually passes over them. It does not form a field of ice by any means, and scarcely does it present an inch of even surface; the whole bristling over with sharp ridges and points, bent forwards like the pikes of embattled soldiers. At the edge of the glaciers, those irregular masses of ice, hollowed and undermined by heat, assume various fantastic appearances, a cavern, a wreck of a ship, the devouring jaws of nameless monsters, wide open, and dripping blood; ferruginous earth, often adhering to the ice, is now washed down into streaks. Although the fragments are often so dirty as to be scarcely distinguishable from the mud and stones among which they have tumbled, yet, when broken, their fracture presents beautiful ramifications of extremely hard ice, perfectly transparent, and not porous as I expected, although divided by numerous interstices like those of coral. Streams of water, of a milky appearance, continually issuing from under the glacier, had formed new channels through the adjacent meadows, cut into ravines, and extending the destruction far beyond what the ice covered. The miserable inhabitants, collected into melancholy groups, looked on dejectedly; but some of them, turning their misfortune to good account, told their sad story, and begged, with a certificate of the magistrates in their hand. Several dwellings are actually under the glaciers, and others await the same destruction."

There are abundant proofs that the glaciers have at former times advanced beyond their present limits. On the average, however, of a number of years, their bulk remains the same; for besides the melting of the glaciers at their lower extremity, there are other causes operating to diminish them, or rather to carry off the additional quantity of snow falling every year. The constant evaporation from the surface of the snow, which must be very great in such elevated regions, is a powerful one. The rate of their progressive motion has been ascertained by experiment.

"In traversing these stagnated oceans," says Captain Sherwill, "very large blocks of granite, of many tons' weight, may be seen riding on the surface of the ice. These blocks have afforded the means of ascertaining a fact of importance. The experiment I am about to relate to you was made last year by some of the guides of Chamouni at the *Mer de Glace*. Two poles were erected, one on each side of the glacier, out of reach of its movement, and so

placed as to be in a direct line with the block of granite. In the course of twelve months this block had entirely changed its position as respecting the two poles, and had advanced upwards of one hundred yards on its march towards the valley;—a clear proof that the glaciers do move on, and are continually diminishing at their lower extremity by the melting of the ice, and increasing at the upper end by the constant snows."

#### THE PRIEURÉ, OR VILLAGE OF CHAMOUNI.

THE principal village in the Valley of Chamouni stands nearly in the middle of it, and is called Le Prieuré (the Priory), or simply Chamouni. It derived the former name, from having been the seat of a convent of Benedictines, which was founded there by Count Aymon of Geneva, towards the close of the eleventh century; and around this establishment, the village was gradually formed. The monastery was afterwards annexed by Pope Leo the Tenth to the Chapter of Sallanches. The only other fact recorded concerning this very unimportant, although much-frequented village is, that the parish church was rebuilt in 1707. There are several other villages in the valley, such as Les Ouches, Les Bossons, Les Prés, Les Bois, Les Tines, Argentière, and La Tour. The valley is divided into four parishes, and the whole number of its inhabitants is under 3000. The Prieuré is the head-quarters of travellers, who can purchase there specimens of the crystals, amethysts, topazes, and other stones, which are found in the neighbouring mountains, and collected by the guides for sale.

There are two very good inns at the Prieuré; and during the summer season they swarm with travellers from various countries of Europe, our own in particular. "The inn at Chamouni," says Simond, "was full of strangers, English and Germans mostly, not one French, all mountain-hunters, talking over their day's sport, asking news about the state of neighbouring mountains, &c., and preparing for the laborious pleasures of the next day: one was leg-tired, the other had his foot blistered, a third was so stiff in the back, he could neither sit down nor get up; but all were otherwise extremely well in health, and happy,—this is a new sport, rock-hunting, plant-hunting, or picturesque-view-hunting, more justifiable in every point of view than hare or stag-hunting, more rational, and even attended with less danger to health or life."

Mr. Bakewell says that the two inns at Chamouni are more like English inns than the inns in any other part of Savoy; the charges, he adds, are very reasonable, considering the distance from whence most of the articles of consumption are brought expressly for the use of the company,—indeed, they are cheaper than in most of the other parts of Savoy or Switzerland, where the accommodations are much inferior. The inhabitants of Chamouni are said to have been somewhat spoiled by the great influx of foreigners, and not to have the simplicity of manners which characterizes the Savoyards in less frequented districts, and which, indeed, they themselves possessed before the valley became a haunt of tourists. "They possess a most annoying kind of ubiquity, following travellers to the mountains, and descending with them into the valleys, to offer fruit and milk, or flowers, which is a most disagreeable mode of begging, as you are surrounded by a crowd wherever you wish to contemplate in quietude the grand objects before you."

The origin of the name "Chamouni" is supposed to be found in two Latin words, occurring in the Latin deed of gift by Count Aymon to the convent; these are *campus munitus*, or "fortified field;" the lofty mountains and inaccessible aiguilles, that surround the valley on all sides, being the natural defence or fortification here implied. "But, to arrive at the literal word 'Chamouni,' we must translate them into French," says Captain Sherwill, "or into the patois of the country, and the signification is equally good in both; for instance, 'campus,' *champ*, and 'munitus,' *muni*. The term Prieuré was generally used until the year 1330; when the few cottages that surrounded the monastic building, assumed the name of Chamouni."

#### CLIMATE AND CULTIVATION OF THE VALLEY.

As the Valley of Chamouni is upwards of 3000 feet above the level of the sea, and surrounded by lofty mountains, its climate is cold. Even during the Summer the thermometer is, in the morning, several degrees below the freezing-point; and in the height of this season, though the weather is often hot, there occur many days which it is

impossible to pass without a fire. For tourists it may be said that the valley is only "practicable" during four months of the year; for the Winter begins in October, and is not over till May. Throughout the whole of this interval the ground is commonly covered with snow to the depth of three feet, and in some parts as many as twelve feet; the inhabitants live like isolated beings, cut off from all communication with the rest of the world, and are obliged to subsist upon the stores which they have laid up before the term of their imprisonment commences.

Saussure says that it is the white frosts that occur in the middle of the Summer, which, together with the shortness of the Summer itself, prevent trees at all delicate from flourishing at Chamouni. "You see there neither oak, nor chestnut, nor walnut, nor even any cultivated fruit-trees; for the apple, and cherry, and plum-trees which grow there, are all of wild sorts. The grafted trees, which attempts have been made to introduce, have never succeeded. They throw out fine shoots in the course of the first Summer, but this Summer is so short that the wood has not time to acquire the consistence and maturity which it needs, to be able to resist the frost; so that the young shoots all perish in the Winter."

It will be interesting to read this naturalist's description of the appearance of the valley towards the latter part of the Winter season. "I arrived," he says, "at Chamouni on the 24th of March (1764): the whole valley was covered with snow; it was a foot and a half thick at the Priory, six feet thick at Argentière, and twelve feet at Tour. The heat of the sun softened this snow during the day, but it froze again in the night to such an extent, that the laden mules passed over it, leaving scarcely any trace. I was desirous of ascending upon the Montanvert to see the great valley of ice, (or the Mer de Glace,) but the thing was found to be impossible: all the slopes of the mountains, turned towards the north, were covered with a quantity of snow, which, never having been softened by the sun, resembled a powder or an incoherent dust, in which we sank above the knee. I was able, however, to advance so long as the ground was neither very uneven nor very much inclined; but as soon as it became a little steep, and above all, when I came to a spot covered with detached and uneven fragments, it was impossible to go further,—we fell down at every step."

This indefatigable man then tried to scale the mountain by the slope turned towards the south; and the snow upon these having been melted on the surface by the warmest rays of the Spring sun, and afterwards been frozen, presented a crust of varying thickness, over which he contrived to make his way to the Mer de Glace. The view which he had of the valley was very striking. "I stopped some moments to enjoy the aspect which the valley of Chamouni presented to me, elevated as I was far above it, and regarding it in the direction of its length. But this aspect was more astonishing than agreeable. The uniformity of those white surfaces which covered immense spaces, from the tops of the mountains down to the bottom of the valley, broken only by a few rocks, whose steep sides were unable to retain the snow, by the forests with their slightly grayish tint, and by the Arve winding like a dark thread in the middle of the picture,—all this, lighted up by the sun, had in its grandeur and in its dazzling brightness something death-like and infinitely sad. The glaciers, which so well adorn the landscape when its ground is a beautiful green, produced no effect in the midst of all this white, although close by, the pyramids of ice, whose steep flanks remained uncovered, appeared like emeralds under the fresh and white snow which covered their summits."

#### GUIDES.

"A traveller, a picturesque traveller at least," says Simond, "above all an English traveller, or supposed to be one, cannot approach Chamouni without being way-laid and beset by guides. Some leagues before we reached these classic grounds we had several on our hands, who after entering into conversation as common peasants, and interesting our curiosity by the knowledge they displayed, informed us they were guides, when they had become pretty sure that we would not say they should not guide us; and really there is no resisting a Balma, a Paccard, a Cochet, a Coutet, when you are at all read in Saussure, and remember his honourable mention of those and other names among his bold supporters up the highest summit of Mont Blanc, in 1786, till then deemed inaccessible."

The guides at Chamouni are licensed by the local autho-

rities; they are all tried men, and generally very civil and trustworthy. Most of the stated excursions are performed wholly or in part with mules, and it is customary for each party of travellers to engage one guide with the requisite number of animals; six francs a day are paid to him for his services, and the same sum for the use of each mule. For the laborious excursions more guides are taken. These men are celebrated for their intelligence, hardihood, and activity; they have a fund of information for the entertainment of the traveller, and are always ready, as Simond says, to "climb, and talk, and fight their battles over again" for his instruction and amusement. They pay a careful attention to his safety and convenience, and on his part he cannot do better than always follow implicitly their advice. Almost all the accidents which have occurred in the mountain-excursions, have been occasioned, as Mr. Bakewell says, by inattention to their advice; and whenever the enterprises in which they have been engaged have had a calamitous result, it has generally happened that they were urged to engage in them in opposition to their judgment and wishes. Most of them are sufficiently bold and adventurous; and some of them wonderfully so—though perhaps, not more so than their physical skill and activity would warrant. Simond mentions a remarkable instance, "a proof of undiminished strength, spirit, and perhaps rashness, at the age of sixty," on the part of a veteran named Jacques Balma, (with the addition *des Dames* on account of his particular attention to ladies climbing under his guidance,) on the return from a laborious expedition. A party of young men, on a botanizing excursion, spied a very fine plant, blooming in apparent safety out of reach, on the top of an inaccessible rock. Jacques Balma considered a few minutes, then took off his shoes, and securing a foot here, a hand there, holding once by his teeth to a twig, springing from one shelving place to another like a chamois, or writhing like a snake among stones and bushes out of sight, without once hesitating or looking back, worked himself up to the pyramidal bunch of flowers, and threw it down to the wondering spectators. That was not enough; another bunch of flowers bloomed over his head in a still more difficult and hazardous situation: he sprang for it; all present united in entreating him to desist, the other guides having warned him of his danger, and then turned away, that they might not appear to encourage the mad attempt. A general exclamation induced them soon after to look again, when they beheld him poised on his breast, plucking the flower with the toes of an outstretched leg. "How he came down," says Simond, "I do not know; it was, perhaps, still more hazardous than going up, but in a few minutes we saw him again by our side, his load on his back, and not even out of breath. When the intrepid old fellow waited on us at supper in the evening, I felt ashamed to see him behind my chair. Jacques Balma was born a goat-herd, and is, perhaps, less well-informed than many of the other guides, but he has in him that genuine spirit which makes heroes, either for good, for indifferent, or for bad purposes."

There is always ample employment for the guides during the season in which travellers visit the valley. During the Winter they have no occupation, and the picture which Mr. Bakewell draws of the manner in which they then pass their time, is not a pleasing one. "As the Winters commence early," he says, "and last till late in the Spring, there is little employment for the men during the season; and the guides being accustomed to a wandering life in the Summer, and to a certain degree of intellectual excitement, by associating with well-informed foreigners from every part of Europe, they would sink into a state of torpor were it not for the dangerous resource of gambling, with which they are said chiefly to occupy themselves in the winter months. It would be extremely difficult to remedy the evil here: in England the substitute for gambling would be smoking and drinking, or politics; but under the paternal government of his Sardinian majesty, great care is taken by the prohibition of books, that the peasants shall neither read nor think, if it be possible to prevent them. The Chamouniards, however, from their Summer intercourse with the world, are less superstitious than the peasants in other parts of Savoy."

#### THE MONTANVERT.

"What the people of Chamouni call properly Montanvert," to use the expression of Saussure, is a pasturage, elevated more than 2600 feet above the Valley of Chamouni, and consequently 6000 feet above the level of the

sea. It is at the foot of the Aiguille de Charmoz, and immediately above that "valley of ice," of which the lower part bears the name of the Glacier des Bois. Strangers are generally taken to it, because it is a spot which affords a magnificent view of this immense glacier, and of the mountains bordering it, and because they can descend from it upon the ice, and thus observe some of the singularities which it presents.

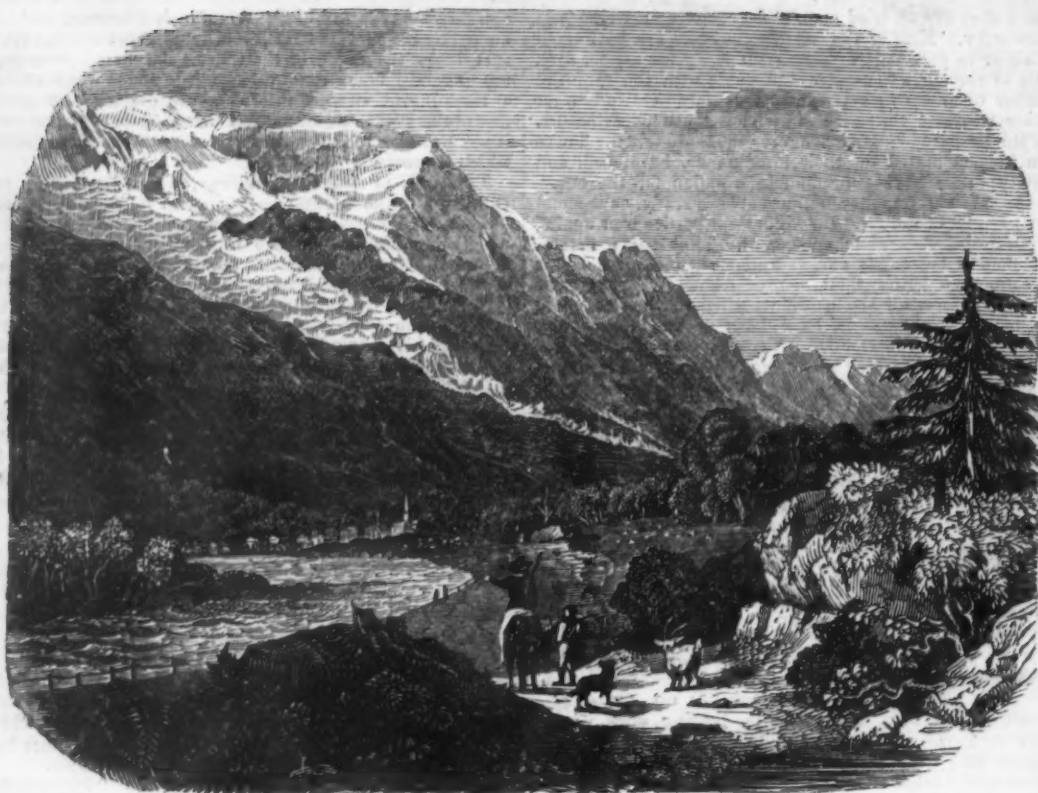
The road, or rather the pathway, which leads from the valley up to the Montanvert, is steep in some parts, but nowhere dangerous. The journey is sometimes performed wholly on foot, and may be in this manner conveniently accomplished in three hours. Till the year 1802, only half of the route from the Priory, or village of Chamouni, was practicable for mules; the whole of it was then rendered so, and accordingly visitors commonly make use of those animals. After leaving the Priory, the road lies along the bottom of the valley, through meadows and well-cultivated fields. Saussure points out as particularly worthy of notice the perfect level which the surface of the ground presents: wherever the ground is a little open, horizontal beds of mud, sand, and gravel, are seen; whence it may be concluded that the Arve formerly covered the whole bottom of the valley, and that this bottom has been raised by the accumulations of the deposits of that river. On quitting the valley, the ascent lies through a forest of birch, fir, and larch, intermixed; it does not proceed directly up the mountain, but winds round it so as to overcome the steep acclivity. On the summit of the Montanvert are two small chalets, or resting-places; one of them was erected by a Monsieur Desportes, formerly "Resident" of France at Geneva, and repaired by a countryman of his. It is dedicated "à la Nature,"—an inscription "a little too finical and affected," as Simond justly observes, and one which might excite a doubt whether the real love of nature had much to do with the erection of this French temple.

The view from this point is very striking. "In mounting to the Montanvert," says Saussure, "you have always below your feet a view of the Valley of Chamouni, of the Arve which waters it throughout its whole length, of a crowd of villages and hamlets, surrounded by trees, and well-cultivated fields. The moment you arrive at the Montanvert, the scene changes; and instead of this smiling and fertile valley, you find yourself almost at the very border of a precipice, the bottom of which is another valley much wider and more extensive, filled with snow and ice, and bounded by colossal mountains, which astonish by their height and shape, and which terrify by their sterility and steepness."

#### THE MER DE GLACE, OR SEA OF ICE.

THE "valley of snow and ice" upon which the traveller looks down from the Montanvert, is the upper part of that enormous glacier, of which the lower part, sloping down into the Valley of Chamouni, is called the Glacier des Bois. This upper part is commonly called the *Mer de Glace*, or Sea of Ice; the limit, however, is not defined, and sometimes the whole glacier is called the Glacier des Bois. "The surface of the glacier seen from Montanvert," says Saussure, "resembles that of a sea which had been suddenly frozen, not in the moment of a tempest, but at the instant when the wind has calmed, and the waves, although very high, have become blunted and rounded. These great waves are nearly parallel to the length of the glacier, and they are cut by transverse crevices, which appear blue in the interior, while the ice seems white on its external surface."

But a distant view of the Mer de Glace is not by any means calculated to convey a correct notion of its peculiar features; and if the surface be not too rugged and too much split by crevices, the visitor should advance three or four hundred feet upon it. "If you content yourself with looking at it from a distant point—from the Montanvert, for example, you do not distinguish any of the details; the inequalities of the surface seem like the rounded undulations of the sea after a storm; but when you are in the middle of the glacier these waves appear mountains, and their intervals are like valleys between those mountains. Besides, it is necessary to traverse the glacier a little, to become acquainted with its curious features,—its wide and deep crevices, its great caverns, its lakes filled with the finest water enclosed within transparent walls of a sea-green colour,—its brooks of fresh clear water flowing in canals of ice, and precipitating themselves in cascades down the icy abysses."



MONT BLANC, AND THE VALLEY OF CHAMOUNI.

This indefatigable naturalist, who certainly cannot be accused of timidity in exploring the wonders of the mountains, recommends that no one should undertake to cross the Mer de Glace from the Montanvert, unless the guides have previously ascertained that it is passable without much difficulty. He says, that in his first expedition in 1760, he hazarded it, and had much trouble in extricating himself. Sometimes he had to slide down to the bottom of little ice-valleys,—the intervals of those mountain-waves which look like small undulations from the Montanvert,—and then to climb up out of them on the opposite side with vast labour and fatigue. At other times, when he came to crevices which were very wide and deep, he had to pass them "like a rope-dancer," on very narrow ridges of ice, extending across from the one side to the other. "The good Pierre Simon, my first guide in the high Alps," he says, "repented strongly of having let me engage in the enterprise. He went about here and there, seeking the least dangerous passages, cutting steps in the ice, offering me a hand whenever he could, and giving me at the same time the first lessons in the art—for it is one—of putting down the feet and resting the body properly, and of making use of one's baton in difficult passages. I escaped, however, without other injury than a few contusions which I got in sliding down some very steep slopes of ice which we had to descend. Pierre Simon slid down, standing upright on his feet, his body thrown back and leaning on his iron-shod baton." This mode of descending a declivity of ice or snow is much more difficult than it would seem to be at first sight; the guides, however, practise it with wonderful dexterity, sliding down slopes of "frightful steepness," and accelerating, or retarding, and even altogether stopping their course at pleasure, merely by pressing the sharp point of their batons into the ice to the requisite depth.

After crossing the Mer de Glace—if he be enabled to accomplish that dangerous expedition, the visiter may repose himself amid the scanty pastures which the rocks opposite to the Montanvert afford, and wonder how the cattle which he sees around him, contrived to get there. He will learn from his guide that, at the commencement

of the Summer season, a regular expedition is made across the Mer de Glace, by those who have to conduct their cattle to this remote spot, whither a number of heifers, with one or two milch-cows for the support of the herdsman, are driven. They remain there until the beginning of Autumn, when another expedition is made to bring them back, it being necessary on each occasion to open a new route for the passage of the animals. The herdsman himself never descends to the valley above once or twice in the season, and then to obtain a supply of bread; during the rest of the period he remains alone with his herd "in this frightful solitude." When Saussure was there in 1760, the herdsman was an old man with a long beard, clothed in a calf's skin with the hair still on its outside. "He had an air as wild as the place in which he dwelt; he was much astonished to see a stranger, and I believe that I was really the first from whom he had received a visit. I should have wished to leave him an agreeable recollection of the visit; but he only wanted some tobacco,—I had none—and the money which I gave him did not seem to afford him any pleasure."

The upper part of this glacier being highly elevated above the valley, avalanches are frequently rolled down from it during a warm Summer's day. "In the course of one hour," says Mr. Bakewell, "we saw four considerable avalanches, and heard several from the other side of the glacier. The masses of ice may be observed in motion for a little time before they detach themselves, and when they fall upon the rocks below, the noise resembles the distant discharge of heavy artillery, followed by a succession of echoes. When the ice was once in motion, it would fall in a continued stream for a considerable time, which, seen at a distance, resembled a cataract: with the ice were intermixed large blocks of stone which had long lain upon the glacier. I counted several seconds between the first motion of the ice and the time when it struck against the rocks, and some seconds more before the sound reached the ear. I could have waited for hours to observe these avalanches, but as the sun declined they were less frequent, and ceased before evening."

THE END OF THE TENTH VOLUME.

